MARINE REVIEW.

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Torpedo Boats for the U. S. S. Maine and Texas.

SOME DETAIL ABOUT THE LITTLE VESSELS THAT REPRESENT A DEPARTURE IN OUR NAVY—A DESCRIPTION SPECIALLY PREPARED FOR THE REVIEW.

These little vessels are something of a departure in our navy, although they have been in use in other navies for some time. Hitherto our service has devoted its attention to larger torpedo boats like the Cushing and the Ericsson, which is building at the Iowa Iron Works, Dubuque, Iowa. The functions of the two classes of boats are different, the larger or first class boats being expected to be capable of keeping the sea for some time, while the small ones, third class, are not intended for extended service but simply operate from the ship which carries them. However, they have a high rate of speed and in an action where the vessels to which they belong cannot make as much speed as they can, they could do a great deal of damage. The boats for the Maine and the Texas are of the same general type but differ in size, as will be seen by the following table of dimensions.

	MAINE.	TEXAS.
Length on L. W. L.	58 ft. 6 in.	48 ft. 1½ in.
Length over all	61 ft. 8 in.	50 ft.
Beam at water line	9 ft. 3-16 in.	9 ft. 3-16 in.
Mean draught	2 ft. 2 in.	2 ft. 1½ in.
Displacement, tons	14.8	12 15
Coefficient of fineness	.455	.462
Weight of hull and fittings, pounds	13,785	10,992
Weight of equipment, pounds	219	184
Weight of ordnance and armor	3,435	3,460

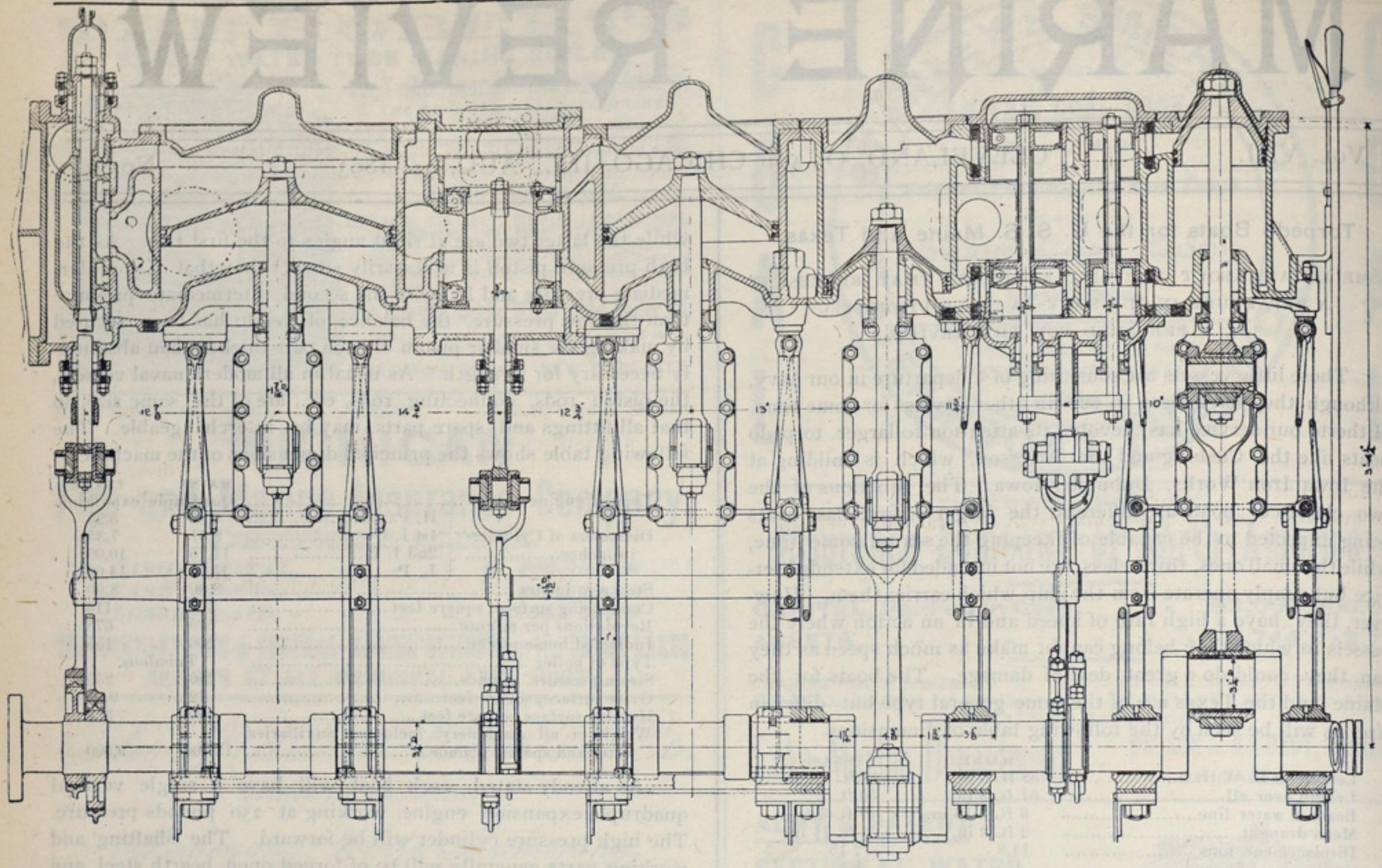
The frames are 1 inch by 1 inch by .8 pounds and the reverse frames ⅞ inch by ⅞ inch by .7 pounds. They will carry a 1-pounder rapid firing gun, and the Maine's boats will have a bow torpedo tube for an 18-inch Whitehead, while those of the Texas will have a deck training tube for a Whitehead of the same size.

The machinery presents a few novel features, although it is chiefly notable for excellence of design to secure lightness and perfect balance of the moving parts. It might be thought at first sight that nothing could be easier than to balance the moving parts by simply making them of equal weight and moving in opposite directions, as has been done in this case, but there is another point which must not be lost sight of, that is the effect of inertia on the power actually given out by the cylinders. As most of our readers doubtless know, it is by no means the case if the indicator card shows a mean effective pressure at the beginning of the stroke, of some 50 pounds say in the high pressure cylinder, that this pressure is transmitted to the crank pin. The inertia of the moving parts must be deducted, and in a small cylinder where the piston speed is high, the reduction is very large. Of course, the effect of the inertia, if properly considered, is beneficial as tending to make the pressure more uniform throughout the stroke, but we have to be very careful that the reduction for inertia does not exceed the mean effective pressure, otherwise we should have the cylinder running for part of the stroke doing no work and actually a drag on the other cylinders. This, however, has been carefully considered in these torpedo boats, and there is no doubt that they will work with unusual steadiness and smoothness at the remarkably high speed for which they have been designed. It may be explained that the balance has been secured by putting the cranks of the high pressure and first intermediate pressure opposite and likewise those of the second intermediate and the low pressure, while the latter two are at right angles to the first two. As the high pressure piston is necessarily smaller than that of the intermediate pressure and likewise the second intermediate pressure than the low pressure, the balance of weight has been secured by making the smaller piston of each pair thicker than absolutely necessary for strength. As usual in all modern naval vessels, the piston rods, connecting rods, etc., are of the same size, so that all fittings and spare parts may be interchangeable. The following table shows the principal dimensions of the machinery:

		MAINE	TEXAS.
Type of engine		Quadruple expansion.	
Diameters of Cylinders in inches	H. P.	6.00	5.25
	1st I. P	8 37	7.35
	2nd I. P	11.75	10.00
	L. P.	15.75	14.00
Stroke in inches		8.00	8.00
Condensing surface, square feet		150	116
Revolutions per minute		675	675
Indicated horse power		200	155
Type of boiler		Tubulous.	
Steam pressure, pounds		250	250
Grate surface, square feet		12	9.25
Heating surface, square feet		480	372
Weight of all machinery, including auxiliaries, water and spares, pounds		12,000	9,900

As already stated, each boat will have a single vertical quadruple expansion engine, working at 250 pounds pressure. The high pressure cylinder will be forward. The shafting and working parts generally will be of forged open hearth steel, and the piston and connecting rods will be oil tempered. The shafting will be hollow. The framing will consist of forged steel columns stayed by diagonal braces, so as to give a firm support to the slides and make the whole structure firm and rigid. The engine bed plate is of plate steel, supported on keelson plates built in the boat, and stiffened by an angle iron running fore and aft on each side of the engine. The engine is also stiffened by what might be called an overhead bed plate, in that the cylinders have the pairs whose cranks are opposite cast together, while they have the two pairs joined by an interlocking arrangement and secured by turned and driven bolts, making an exceedingly rigid connection. All of the cylinders except the low pressure will have piston valves, the low pressure having a double ported flat slide. The valves of the high pressure and first intermediate pressure will have no rings, while that of the second intermediate will have a broad adjustable ring. The valve gear will be the Stephenson link motion.

The most novel feature in these engines will be the air pumps, which are the design of Passed Assistant Engineer Frank H. Bailey, United States Navy, chief designer for the bureau of steam engineering. As is well known, it is generally considered the best practice to have the air pumps run at a comparatively low speed and to be of the single acting, bucket plunger type, so that it would hardly be thought possible that air pumps could be run efficiently from main engines at a speed of nearly 700 revolutions per minute. This, however, will be the case in these boats, for economy of both steam and space, as independent pumps, while highly efficient in securing a vacuum, are very wasteful of steam. The pumps are only 3 inches in diameter by 3¼ inches stroke, and each engine will have two of them driven from an eccentric on the forward end of the shaft. The pumps are horizontal and double acting. The piston is solid and there are no foot valves, while the delivery valves cover the entire end of the cylinder, being held in place by a light spring. The opening for admission of water and air is at the middle of the length



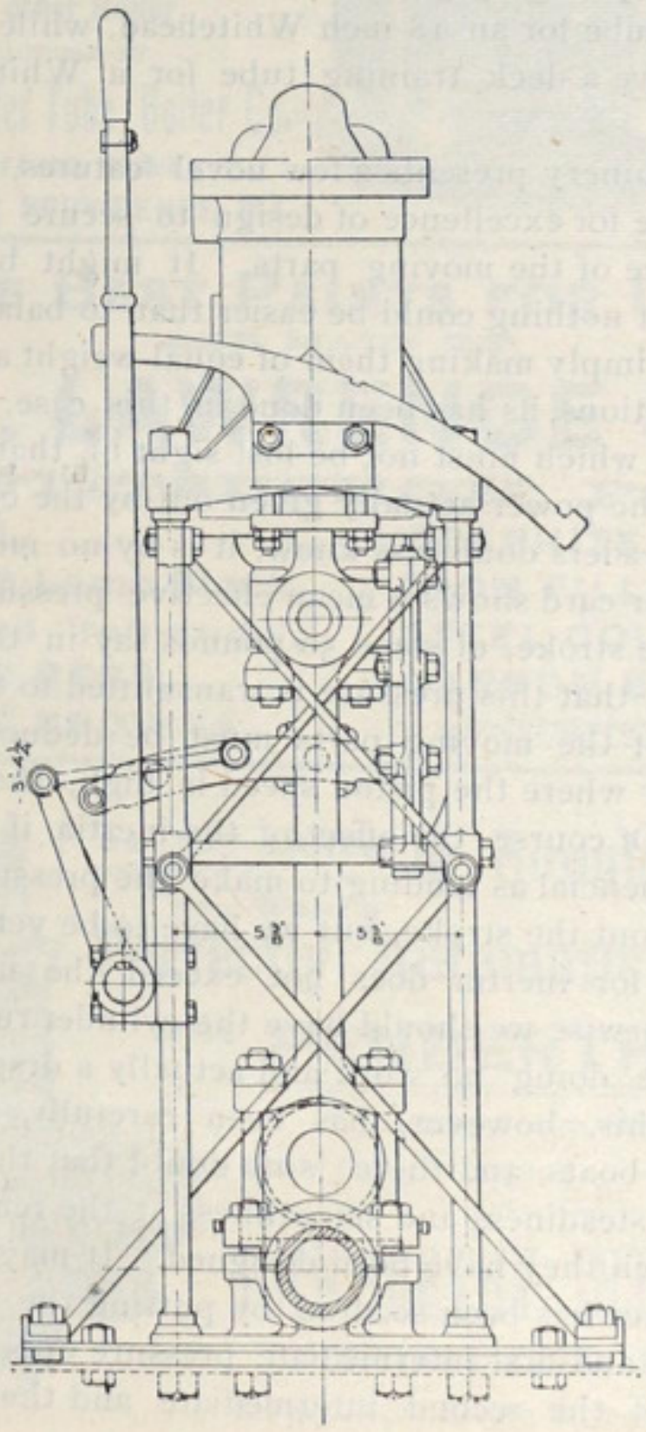
of the cylinder and cuts the cylinder in two, except for the bars across the opening. When the piston is at the end of its stroke, this port is entirely open, but as the piston moves on it gradually closes it, doing so completely somewhat before half stroke. As is seen at once, the pump is simplicity itself, It is not an experiment in these boats, as one has been tested at various speeds up to 1,000 revolutions per minute with excellent results. To get this last speed, the screw of the launch on which the test was made was removed, and as the condenser was of the keel type, there was naturally very poor circulation of the cooling water, being merely that due to the current in the river. Yet, even under these disadvantageous circumstances, a vacuum was obtained of 20 inches. This is one of the most remarkable feats in connection with air pumps on record. It will be readily understood that the use of a pump driven from the main engine and at this high speed saves a great deal of weight.

While the boat is in motion, the cooling water will be circulated through the condenser tubes by means of scoops over the injection and outboard delivery openings, as is the common practice with all torpedo boats, while an auxiliary circulating pump of the centrifugal type is fitted with a capacity sufficient to just condense all the steam the boiler will make when the boat is stopped.

The boiler of each boat will be of the coil or tubulous type and it is probable that different makes will be used in the different boats so as to get experience with all those of good makers. The navy department is thoroughly in earnest in the matter of the introduction of coil boilers as soon as their durability has been thoroughly established, and the building of these boats gives an excellent opportunity for a comparative test. The forced draft will be on the closed fire room system and it is probable that quite a high air pressure will be used, as the great elasticity and thinness of coil boilers enables them to stand any degree of forcing without injury.

An interesting feature, as shown on the drawing of the engines, which is given on page 6, is the shafting. It hardly amounts to more than a pipe, as the thickness is only three-eighths of an inch. This was done, of course, to secure lightness, and comes about because it was necessary to make the external diameter as much as it is to secure bearing surface for the journals. As this would give a strength considerably in excess of the actual requirements if solid, it has been possible to make a relatively large hole. In large shafting the internal diameter rarely exceeds 50 per cent. of the external, while in this case it is more than 75 per cent.

The speed of the Maine's boats is expected to be 18 knots and that of the boats of the Texas 17 knots. The hull and machinery of the former are building at the New York navy yard, while those of the latter are building at the Norfolk yard.



Lake Freight Matters.

Although the aggregate output of iron ore from Lake Superior mines for the full season will not drop to 4,000,000 tons, as some predictions would indicate, it will certainly not be much, if any, above 5,000,000 tons, against a little more than 9,000,000 last year. Statements for the month just closing will very probably show a reduction for the month equal to about 50 per cent. of the entire reduction for the season to Aug. 1. Among all interests, something of an improvement in freights for the balance of the season is expected, but it is very slow in coming, and although there has been a fair movement of grain out of Chicago, vessel owners are gradually inclining to the opinion that the wheat in store there is held by the speculators, aud will not be moved for some time to come. Several times during the past ten days, since money matters have eased up a little, there have been signs of more activity in both coal and grain, but the amount of tonnage offering, even with the large number of vessels laid up, is still in excess of the demand. A general improvement in freights would prompt an early advance of 5 or 10 cents in the very low ore freights, but there is no hope of ore freights leading the general market, excepting in the event of additional ore sales, which seems highly improbable under the present condition of the iron market. It is generally admitted that coal dealers of Chicago and northwestern points are very much behind their requirements in receipts of coal by lake, although their docks are crowded in many cases now so that they can not store more coal. "At this time a year ago," said a Chicago dealer who was in Cleveland recently, "I had cleared my coal sheds three times, through shipments to small dealers, and was beginning on the storage of another supply for the winter. This year we have not only failed to clear the sheds at all, but have shipped only a small number of cars, and we are loaded up with coal received by lake early in the season. Very high prices are certain to prevail all through the west for coal during the fall and winter."

Ship Building and Engineering on the Great Lakes.

Of all the papers presented to the Engineering Congress, held in connection with the World's Columbian Exposition, that of Walter G. Miller, superintending engineer of the Globe Iron Works Company, Cleveland, was most exhaustive, and showed most labor and expense in its preparation. This is not said on account of any local pride on the part of the REVIEW, as the paper was most highly complimented by Commodore Melville and Past Assistant Engineer McFarland, the chief officers of the branch of the congress devoted to marine and naval engineering and naval architecture, The paper is accompanied by about thirty engravings of hulls and machinery, made from plans of different types of lake vessels turned out, within the past ten years, from several lake shipyards, and in this respect will, in itself, make the report of the proceedings of the congress, to be published shortly, a most valuable book of reference for everybody interested in lake shipping. During two or three years past, the REVIEW has succeeded, with considerable difficulty, in placing before its readers sectional drawings of some of the modern lake vessels. In one paper Mr. Miller now presents thirty or more such drawings, not only of vessels built by the Globe company but also of the passenger steamers and car ferries constructed by the Detroit Dry Dock Company and the whalebacks from the yard of the American Steel Barge Company.

Mr. Miller takes up the subject of ship building and engineering on the lakes from 1881, a period when the adoption of iron as a ship building material, and the introduction of compound engines for the propelling power, began to be considered. The paper deals quite extensively in statistics of lake commerce from authentic sources, and then to facilitate a description of lake steamers and their machinery, which is the most important part of the work, the vessels are divided into four principal classes, designated as follows: First and most important, the ore, grain and coal carriers; second, package freight, coal and grain; third, lumber and coal; fourth, passengers and miscellaneous freight. A general description of these different kinds of vessels follows, and then the best practice of ship and engine builders on the lakes is shown in detailed descriptions of the most important types, accompanied by drawings in plan and section. Of the modern ore and grain carrier there are illustrations showing midships and longitudinal sections, spar deck plan, side elevation of vessel and cross sections through engine and boiler spaces. The drawings of other types of ships and engines are equally complete, and among the boats specially described are the Detroit and Cleveland Steam Navigation Company's paddle steamers, a whaleback steamer 265 feet in length, one of the double screw car ferries running in the Straits of Mackinaw, the twin-screw passenger steamer Virginia and one of the big twin-screw express steamers building in Cleveland for the Northern Steamship Company.

Why Oil has an Influence on Waves.

A great deal has been written about the influence of oil on waves at sea, and of the practically useful action of oil in many well recorded cases there is abundant testimony, but little has been heard of the reason for the results so obtained. W. J. Millar, secretary of the institution of engineers and ship builders in Scotland, treats of this side of the subject in a paper submitted to the recent Engineering Congress at Chicago. He says: "From experiments made in shallow, broken water on the coast, where the wind and tide conflicted, it would seem that little or no advantage is apparent in such circumstances; that is to say, the wave-motion being disturbed and under forces not wholly those of wind action, the oily film becomes broken up. In deep water, however, where the waves may be considered as wholly formed by the wind, their forms are more regular, and it is in such circumstances that the recorded examples show to best effect. These facts in themselves point in some measure to the real action of the oil. According to some theories the oil acts as it does when applied to bearings in machinery, and thus the wind glides more readily over the oiled surface than it does over the water surface. It is difficult to see, however, how the frictional resistance between air and oil should be less than between air and water, as the oil is a less mobile fluid than the water. Again, when we consider the surface tension of fluids, and can often observe their restraining action on ascending airbubbles or small floating objects in glasses of water, we might suppose that by the addition of the film of oil sufficient resistance was offered to the uprise of the upper part of the wave, and thus the tendency to break would be restrained. The author, both from experimental results and other data, has come to the conclusion that the action of the film of oil is one of separation. Thus it seems to him that when we consider the tendency of air to become saturated with watery vapor due to evaporation, and of water to retain air by absorption, we may readily conceive that the impact of air on a watery surface will tend to cause a commingling at the surface of air and water, which will thus offer sufficient resistance to the motion of the wind to throw the water and mixture into an undulatory movement, and therefore, when this forward movement has exceeded the speed due to the periodic motion in the wave itself, the upper part in falling forward, due to the push of air from behind, shows a foaming rush of broken water; that is, the air incorporated with the water and the water itself. If this be admitted, it is easy to see how a film of oil spread over the surface of the water may effectually prevent the formation of broken water, as the air and water will be kept separate, the tendency to mutual absorption at the surface will be checked, and the wind will therefore pass along the oily surface with reduced power of wave-making."

Boilers, Circulation and Action—the "Scale Pan."

[*By John M. Sweeney of Harvey, Ill.*]

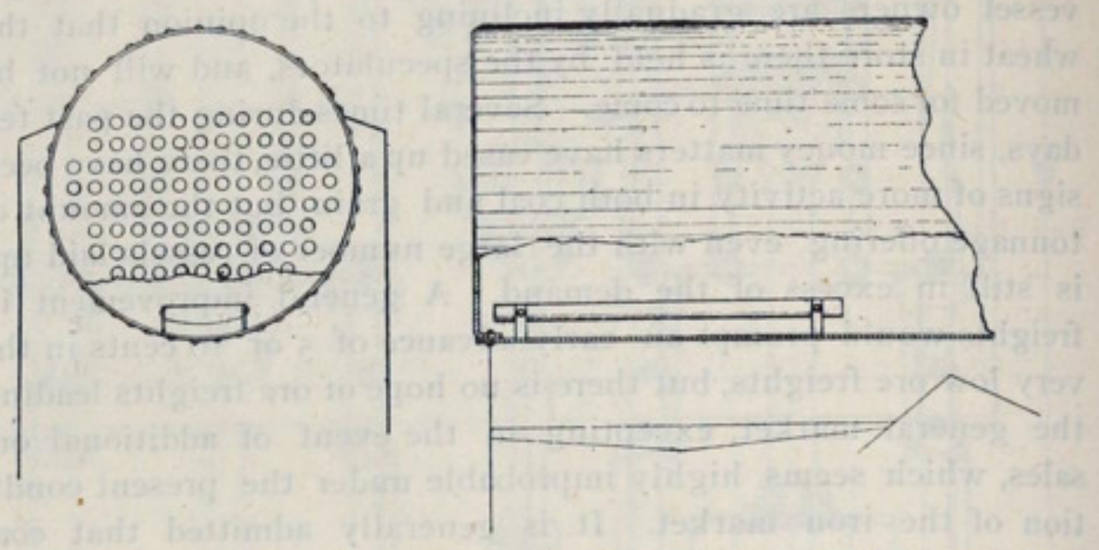
In the opinion of the writer there is nothing within the province of the "steam engineer" that is as little understood and so worthy of investigation as the natural laws which govern the properties of steam generators; the manner in which heat is taken up by the water, and the flow of energy through the plate. The discussion at the recent International Engineering Congress at the world's fair has demonstrated, however, that new interest is about to be taken in these questions. A boiler under conditions of natural draft, rendering satisfactory service with no leaks, is fitted with a forced draft appliance! Result—leaky flues. Why does this happen? A flow of cold air into the furnace of a boiler results in leaky flues! What is the actual process through which the flues are caused to leak? It is almost a daily experience to see plates of boilers bagged, burned or injured by overheating of the plate. What is the phenomena occurring to bring about this effect?

It is not the intention in this paper to endeavor to investigate all these questions, but to describe, at present, a device now in use on many marine and stationary boilers, for the purpose of preventing the overheating of the plate, as covered in the last question, and to later take up a full discussion of the several questions in other papers. To the investigator in this field comes first to decide the temperature of the plate under proper working conditions, and right at the threshold of the investigation a halt must be called to discover this, the first essential. Recently there has appeared in leading mechanical journals some accounts of experiments undertaken to determine these temperatures; how they may vary with different thicknesses of plate, and different temperatures of applied heat. Generally these experiments have been directed to a determination of results through the fusing or non-fusing of plugs of tin, lead, antimony or other substances placed in the plate, through which the heat was to be transmitted or through which the energy was to flow. It is well known to many engineers that a tea kettle or like vessel, in which water is made to boil or circulate, may be lifted from the fire and the hand applied to the botton of the vessel, which has been in contact with the fire, without injury to the hand or without any sense of heat being present in the bottom of the vessel. It is also well known that this low temperature will continne so long as the water continues to circulate. Later when the heat is transmitted from the water into the air, the temperature of the bottom rises to the temperature of the water, nearly, because the air is a slow absorbent and the resistance of the material in the bottom of the vessel is too great for the number of heat units offered.

Applying this knowledge to boiler practice, it must follow that in case of the occurrence of a bag, or burn, in a boiler plate, the temperature of the plate at that point has been raised. As a matter of fact it will be found that scale or other matter has accumulated inside of the boiler at the point where the bag occurs, and has prevented the water from contact with the plate on the inside. The water being absent at this particular point, nothing remains to absorb the energy which the plate stands ready to transmit; the plate becomes hot, and the pressure within the boiler forces the hot part out and produces the pocket or bag. Therefore, to prevent scale or other matter from accumulating on the plate in quantity to prevent wetting, is the most direct way to prevent bagging or burning. Since such bags occur over the hottest part of the fire, it is found only necessary to provide a relief where the furnace temperatures are the greatest, generally over the grates.

The device herewith shown is illustrated as placed in the bottom of an externally fired boiler, over the grates,and is known as a "scale pan," It can be placed equally well over the crown sheet of a fire box boiler, or over the top of a furnace, provision being made to clear the stays where necessary. The pan is made of say No. 14 B. G. sheet iron, about 5 feet long and generally 12 to 14 inches wide, suitable for admission through the manhole opening into the boiler. In the case illustrated the pan is curved to a radius 2 inches less than the radius of the sheet of the boiler, this curvature being made the narrow way of the pan. The sides are flanged up for a width of about 2 inches in order to slightly stiffen the pan, and to this flange are riveted two or three legs on each side, the legs being 2 inches long below the bottom of the pan and attached to the flange of the pan with one rivet, so that they may be turned to lie with the flange on the pan, thus facilitating removal or return through the man hole opening. The legs are made of No. 14 sheet iron, and only about 1½ inches wide, so that the amount of area in the end of the leg coming in contact with the sheet of the boiler is inconsiderable.

The placing of this pan as described will prevent scale accumulations on the sheet, but will cause accumulations within



the pan itself. Indeed if a punched washer or other foreign substance be placed on the boiler sheet under the pan, before the boiler is closed and filled with water, it will invariably be found within the pan upon the opening of the boiler after use. One peculiar fact noted in the use of these pans, is that more scale in weight seems to be taken from the boiler with the pan than from the same boiler, performing. as nearly as can be the same evaporation, without the pan, which brings the query: What becomes of the scale and other matter received by the boiler? It is not the intention at this time to enter into an exhaustive discussion as to how or why the washer or scale goes into the pan; that will be taken up later. There is no patent on the "scale pan," and anyone troubled with bagged boilers will find it a boon indeed.

The St. Clair Tunnel Company is considering the advisability of adopting electric transit through the tunnel, and have secured estimates for such an equipment. The smoke from the engines is having a most serious effect upon the interior of the tunnel, and Chief Engineer Hobson is greatly concerned over the matter. The question of cost, however, is yet to be overcome before any definite action is taken.

The Deep Waterway Question.

Editor MARINE REVIEW: Referring to your editorial in the MARINE REVIEW of August 24, I wish to state that the paper on "A Waterway from the Lakes to Tidewater," although discussed by the delegates at the Water Commerce Congress, was written for and printed in the Railroad Gazette of July 7. In regard to the result that will probably be obtained on the completion of the present contracts for deepening the channels of the lake waterways, the statement quoted in your editorial is simply a fact that may be easily verified by any one who will take the trouble to investigate the matter. Details were not given for the reason that the subject was quite fully discussed in a paper printed in the Railroad Gazette of Feb. 3, and to which reference was made.

The facts of the matter are that the present contracts are for channels 20 feet deep at mean lake level; that during seasons of low water the lake surface is from one to two feet below mean level, and that, owing to the shallowness of the water at the head of Lake Erie, strong westerly winds cause a lowering of the surface there of from one to six feet. It is therefore quite evident that during low water seasons the average depth will be from 18 feet to 19 feet, and that during periods of westerly winds vessels of more than 16 feet draft will be very likely to have trouble in navigating the channel. This trouble is not noticeable in the present channel, for the reason that the depth at the head of Lake Erie, for mean level, is 3 feet greater than that in Lake St. Clair. When the channels across Lake St. Clair, however, are deepened to 20 feet, the fluctuation of the water surface at the head of Lake Erie will, without question, become a source of great annoyance to vessel interests.

Detroit, Aug. 25, 1893. GEO. Y. WISNER.

Subscribe for the official report of the Engineering Congress through the Marine Review. Price $10.

The Break Through Chequamegon Point.

It is somewhat surprising how statements like that in regard to Chequamegon point originate, and when considered in connection with the facts they are amusing to say the least. This cut has existed since 1872, and has been used continuously for twenty years by light draft fish boats as a short route from the bay into Lake Superior. An examination made in 1879 shows the cut at that time to have been about one-half mile wide, and a careful survey made in 1887 shows a width of 4,000 feet, from which it would appear that if the present cut is only 400 feet wide, as stated in the dispatch, it is only one-tenth as wide as it was six years ago.

The first appropriation for the improvement of Ashland harbor was $22,500, made in 1886. The engineer officer in charge of the district not knowing exactly what to do with this money, finally concluded to expend it in closing the gap through Chequamegon point. In the summer of 1887, a civil engineer of considerable experience on lake work was engaged to make an examination and survey of the point and vicinity, for the purpose of getting the data needed for drawing up specifications for a contract. This survey disclosed the fact that the cut was doing no harm whatever, and that to expend the appropriation in closing it would be a useless waste of public money. The engineer so reported and recommended that only enough money be expended there to revet the point of island at the north side of the cut, so as to prevent further erosion to the northward. This report was not satisfactory to the engineer officer in charge, and advertisements for bids for doing the work were issued.

The people of Ashland wished the appropriation expended inside of their harbor and considered the closing of the cut an unnecessary expense. They therefore sent a committee of business men to Washington to lay the facts before the secretary of war, who, after considering the protest, ordered the advertisements for bids annulled. Nothing has been done in the matter since. The total appropriations to date made for Ashland harbor amount to $187,500, nearly all of which has been expended in building a breakwater and dredging in front of the city of Ashland.

Bills of a Marine Nature.

Senator Frye has introduced in the Senate within the past two weeks a number of bills of a marine nature. One of them, No. 586, providing for communication from light-ships and outlying light-houses to the shore, is a duplicate of a measure which was not reached in the last Congress. An appropriation of $50-,000 is sought for the purpose of experiments to be conducted by the light-house board.

A second bill, No. 510, relates to the protection of wages of seamen, and is also a duplicate of a measure that was introduced too late for consideration a year ago. It proposes to apply to the shipping business of the lakes and the coast the law regarding wages of seamen in the foreign trade, which provides that no wages due or accruing to any seaman or apprentice shall be subject to attachment or arrest from any court. The bill is in the nature of amendment to Section 4,536 revised statutes, and in addition to applying the law of the foreign trade to the lakes and coast, it provides also that any writ of attachment or other paper for the enforced collection of a seaman's wages, in contravention of the amendment, shall be void and any officer executing the same shall be subject to fine and imprisonment.

Inventor of the Screw Propeller.

In referring to the recent celebration in Austria on the centenary of the birth of Joseph Ressel, inventor of the screw propeller, who died in poverty and neglect in an inn at Laibach in 1857, the Shipping World of London says: "His claim to priority in the invention of the screw propeller was disputed in England and elsewhere, but seems now to be well established, the various documentary proofs having just been published, together with invectives against his "stupid countrymen" and the "heartless foreigner who snatched the honor and the glory from him to whom both were legitimately due." Ressel described his idea of using the Archimedian screw for the propulsion of ships as early as 1812. It was not until 1829, when his former patents had all lapsed for want of money to renew them, that he succeeded in interesting a Trieste merchant, named Fontana, in his invention. A small steamer, the Cidetta, fitted with the first screw, left Trieste harbor in that year, and prove manageable in every respect for the first five minutes, when, unfortunately, one of the pipes burst. This was enough for the Trieste authorities to forbid any further experiments of the kind, and the inventor had to continue as an employe of the forestry department of the government on a salary of £70 a year. That his great achievement should have been unrecognized and unrewarded during his life time is perhaps the best of all reasons why the present opportunity should be taken to do honor to his name, and to perpetuate his memory in an effective manner."

Iron Mining Matters.

Shipments of iron ore from Two Harbors up to and including Wednesday, the 23rd inst., aggregated 618,812 gross tons and were divided as follows: Chandler, 303,875 tons; Minnesota, 257,-987; Zenith, 2,011; Cincinnati, 9,917; Canton, 21,643; Franklin, 22,166; Hale, 1,213. Shipments of Gogebic range mines through Ashland up to and including Saturday, the 19th, foot up 777,535 tons, divided among the different mines as follows: Ashland, 26,465 tons; Aurora, 119,695; Colby No. 2, 28,594; Tilden, 72,795; Germania, 4,975; Iron Belt, 7,544; Montreal, south vein, 1,347; Montreal, north vein, 25,850; Brotherton, 14,643; Comet, 5,035: Eureka, 26,115; Careys, 32,931; Newport, 70,348; Norrie, 161,322; East Norrie, 64,649; Pabst, 83,353; Jack Pot, 1,651; Davis, 11,353; Sunday Lake, 17,525.

Mr. William G. Mather, president of the Cleveland-Cliffs Company, is trying to keep miners in Ishpeming during the period of idleness at the mines. The town authorities are trying to dispose of $5,000 worth of town bonds, for the purpose of giving the men work on the streets, and if they are successful and the citizens desire to issue bonds to the extent of $5,000 additional, Mr. Mather has agreed to take the second issue.

Henry B. Shields, manager of the Girard Iron Company, Girard, O., writes the Iron Trade Review of Cleveland that there is no ground for the claim that the accident at the Girard furnace was due to the fineness of Missabe ore used in the furnace. He adds that the company expects to use successfully and alone Biwabik ore from the Missabe range.

In twenty-two days just previous to the closing of the Biwabik mine on the Missabe, on account of the money stringency, 30,000 tons of ore was shipped. It was claimed that with one steam shovel the average number of cars loaded in a full day, including time taken up in switching and moving the steam shovel, was sixty of twenty-four tons each.

One big manufacturing concern that is well known on the lakes, the Berlin Iron Bridge Company of East Berlin, Conn., does not seem to be disturbed by prevailing dullness in industrial centers. The entire plant of this company is running full time. The contracts include a new electric light and power station at Lynn, Mass., a drawbridge at Salem, Mass., a new foundry building for the New Home Sewing Machine Company, at Orange, Mass., an iron building to go to Tampa, Fla., a large bridge for Chester county, Pa., a new iron storehouse for the New York Knife Company, at Walden, N. Y., a large power plant for the Philadelphia Traction Company, a large cotton shed for the Southern Pacific Railroad, at New Orleans, La., a new roof for the purifier house of the Northern Liberties Gas Company, at Philadelphia, a new power house for the Reading Traction Company, Reading, Pa., a new power house for the State Street Railway Company, at New Haven, Conn., a car barn for the Easton Transit Company, at Easton, Pa., a large smelter building for the Anaconda Smelting Company, at Anaconda, Mont. The work now in hand will keep the company busy for five or six months.

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DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.

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The books of the United States treasury department contain the names of 3,657 vessels, of1,183,582.55 gross tons register in the lake trade. The lakes have more steam vessels of 1,000 to 2,500 tons than the combined ownership of this class of vessels in all other sections of the country. The number of steam vessels of 1,000 to 2,500 tons on the lakes on June 30, 1892, was 321 and their aggregate gross tonnage 534,490.27; in all other parts of the country the number of this class of vessels was,on the same date, 217 and their gross tonnage 321,784.6. The classification of the entire lake fleet is as follows:

Class.	Number.	Gross. Tonnage.
Steam vessels	1,631	763,063.32
Sailing vessels	1,226	319,617.61
Canal boats	731	75,580.50
Barges	69	25,321.12
Total	3,657	1,183,582.55

Tonnage built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

	Number.	Net Tonnage.
1888	222	101,102.87
1889	225	107,080.30
1890	218	108,515.00
1891	204	111,856.45
1892	169	45,168.98
Total	1,038	473,723.60

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC.

	St. Mary's Falls Canal.			Suez Canal.		
	1892.	1891.	1890.	1892.	1891.	1890.
No. vessel passages	12,580	10,191	10,557	3,559	4,207	3,389
Ton'ge, net regist'd	10,647,203	8,400,685	8,454,435	7,712,028	8,698,777	6,890,014
Days of navigation..	223	225	228	365	365	365

Entered at Cleveland Post Office as Second-class Mail Matter.

BUFFALO underwriters and attorneys have again raised the question of the liability of vessel owners under section 3 of the Harter bill of lading act, passed by the last Congress and signed by the president on Feb. 30, 1893. The particular section of the act over which the question of doubt has been raised provides that "if the owner of any vessel shall exercise due diligence to make the said vessel in all respects seaworthy and properly manned, equipped and supplied, neither the vessel, her owner or owners, agent or charterers shall become or be held responsible for damage or loss resulting from faults or errors in navigation or in the management of said vessel." This section, if not governed by the nature of the act and other provisions which it contains, would certainly seem to release the vessel owner from liability even for the sinking of another vessel in collision where there was proof of negligence of navigation, and such is the construction put upon it by some people in Buffalo and, it is claimed, by certain New York lawyers. The best admiralty lawyers on the lakes will not, however, look upon the act in this light, as shown in an editorial in the REVIEW of April 27, last. Speaking of the law again, a few days ago, Mr. Harvey D. Goulder said that no court would entertain such a construction of it for a moment. It is a measure of a special nature, the title showing that it relates to "navigation of vessels, bills of lading, and to certain obligations, duties and rights *in connection with the carriage of property*." The provisions of section 3 refer to obligations, duties and rights connected with the *carriage of property*, and not to the liability of one vessel owner to another for damages resulting from collision. As Secretary Keep of the Lake Carriers' Association puts it, the section refers only to the vessel's own cargo, and is intended to head off suits by the insurance companies against the vessel after paying losses on cargo injured in a collision. Mr. Keep had a hand in framing the law and says that such was the intention when the act was prepared for presentation to Congress, and that it was passed with the same end in view.

A SHORT time ago Supt. Martin Lynch and three assistant superintendents at the St. Mary's Falls canal were removed by orders from the secretary of war and their places filled by four Democrats, who have figured quite actively in politics at Sault Ste. Marie. As Mr. Lynch and his associates were also Democrats, appointed during President Cleveland's first term, the change was surprising. No complaint has been made regarding the ability of the new men to care for the work assigned to them, and on this score there is little room as yet for a protest from the vessel interests, but the action of the secretary of war in changing a part of the lock force without cause would seem to indicate a disposition to introduce politics into the management of the canal. In fact, it is understood that this change was made without Gen. Poe being consulted in any way, and that it was prompted by Don. M. Dickinson of Michigan political fame. That other changes will be made seems probable, as it is charged, by those who are seeking the places, that Gen. Supt. Wheeler has shown a partisan disposition in the appointment of inspectors and other government employes on the different works of improvement, and that he would already have been removed but for his knowledge of the detail connected with the several extensive contracts now under way. Whatever may be said of the results of either Republican or Democratic influences in the management of the canal in the past, it is to be hoped that some steps will be taken soon to secure the permanent employment of capable men in the government force at the Sault. The importance of having competent men in charge of these locks should warrant the application of civil service rules to the principal positions.

SENATOR CHANDLER, of New Hampshire, would have a canal constructed along the coast of the southern Atlantic states below Virginia, because of the stormy Hatteras and treacherous Nags Head. He offered in the senate, a few days ago, a resolution, which was sent to the committee on commerce, instructing that committee to inquire into the expediency of the construction in the near future, by the aid of the government, of an interior coast line of water works across the head of the peninsula of Florida, along the coast from Florida to Hampton Roads, between Chesepeake bay and Delaware bay and by Cape Cod, for the purpose of securing commercial and military advantages. It is argued in favor of the scheme that from Chesapeake bay to Florida there already exists a vast system of salt-water sounds which can be connected by several short canals, and thereby afford the desired navigation without great cost. With other canal measures, far more important than this from a commercial standpoint, already pressing congress, it is probable that little attention will be given Senator Chandler's resolution, especially as the only important claim in favor of the project is the "removal of the dangers of the coast navigation." The vessel owner whose ship was run for profit would continue to follow the coast route after the canal was built, as his vessel would make three trips in the broad ocean to the one that could be made in the proposed system of canals and sounds.

The wooden steamship W. P. Ketcham, built by James Davidson of West Bay City. Mich., for the Ketcham Steamship Company of Chicago, was launched Saturday. She is 250 feet keel, 37 feet beam and 13 feet 2 inches depth of hold. Her capacity is about 1,000,000 feet of lumber. The schooner Owen, launched from the same yard a short time ago, will be the consort of the Ketcham.

FIFTEEN PHOTOTYPES OF THE LATEST LAKE STEAMERS AND A PICTURE OF THE GREAT EASTERN, NEATLY BOUND, FOR 50 CENTS. WRITE THE MARINE REVIEW, NO. 516 PERRY-PAYNE BUILDING, CLEVELAND, O.

Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store at the principal points of accumulation on the lakes on Aug. 26, 1893:

	Wheat, bu.	Corn, bu.
Chicago	18,402,000	1,227,000
Duluth	2,558,000	.....
Milwaukee	955,000	.....
Detroit	892,000	9,000
Toledo	1,376,000	47,000
Buffalo	1,219,000	294,000
Total	25,302,000	1,577,000

At the points named there is a net decrease for the week of 964,000 bushels of wheat and a net increase of 36,000 bushels of corn.

Launch of the Centurion.

In THE MARINE REVIEW, issue of March 2, 1893, there is a very full description, with engravings, of the steel steamer Centurion, launched Wednesday from the yard of F. W. Wheeler & Co., West Bay City, Mich. March 2 was the date on which the keel of the steamer was laid, and considerable ceremony accompanied the work, as the builder, Mr. F. W. Wheeler, was on that day forty years of age and the boat was No. 100 in the yard. The Centurion has since been purchased by the Hopkins Transportation Company, of which Capt. John Mitchell of Cleveland is general manager, and the only alteration of importance made since the plans were published is a change in the location of the engines from amidships to the after part of the boat, as is the case with nearly all modern lake steamers. The principal dimensions of this boat are: Length over all, 378 feet 6 inches; length of keel, 360 feet; breadth, extreme, 45 feet 2⅜ inches; breadth, moulded, 45 feet; depth, moulded, 26 feet; depth of hold 13 feet 2½ inches; height between decks, 9 feet 2 inches; height of forecastle, 7 feet 6 inches. The engines, also built by F. W. Wheeler & Co., are triple expansion, with cylinders 23, 37½ and 63 inches by 44 inches stroke, driving a Trout wheel of 13 feet 6 inches diameter. There are three cylindrical boilers of the return tubular type, 12 feet 6 inches diameter and 12 feet 8 inches long, working at a pressure of 170 pounds.

With Roberts Boilers.

The steel steam yacht Marietta designed by Mr. Henry J. Gielow and owned by Mr. Harrison B. Moore of New York, had her trial trip yesterday. She left Erie Basin at 3 o'clock and went as far as Yonkers and returned. The yacht is very steady and a good sea boat. The run from Yonkers to the Battery, against head wind and tide, with natural draft and damper partly closed, the boat averaged 16½ miles an hour.

The foregoing paragraph is from the New York Herald of August 25, and the item is interesting in view of the fact that the Marietta contains two of the four Roberts boilers which were formerly in the steam yacht Radha. These boilers were condemned as a failure and taken out of the Radha, notwithstanding the fact that they never gave any trouble when Mr. Roberts or his representative was aboard. The Radha at one time ran from Poughkeepsie bridge to the Battery against the tide in 4 hours and 50 minutes with these boilers and natural draft, but her engineer did not seem able to appreciate them. After standing two years on Tebo's dock, exposed to the weather, they were sold at auction and bought by John W. Sullivan, who then sold two of them to Com. Moore. They were put in the Marietta without any alteration or repairs, after being tested at 400 pounds hydrostatic pressure and licensed for 250 pounds of steam pressure. The result shows that Com. Moore's confidence in the boilers was not misplaced. He had used two Roberts boilers previously, and is an enthusiastic admirer of them.

The captain of the English ship Glenesslin, lately arrived at Philadelphia, brought an order from her English owners to purchase two Providence power capstans from the American Ship Windlass Company for use on that ship. The owners stated that the Providence capstans were better and cheaper than English capstans.

From the Fair City.

WESTERN OFFICE, MARINE REVIEW,
No. 701 Phoenix Building, CHICAGO, Ill., Aug. 31.

The Christopher Columbus carries out an unusually large load of people to Milwaukee every Sunday, to the surprise of all passenger steamboat men. Last Sunday she had about 3,200, and more would have gone had they not got down too late to get on board, The line needs all this help, evidently, for it is said that the other boats are losing money in the regular trade, and that the profits on the Sunday excursions are necessary to pay expenses. All other steamboat schemes, of which there were so many in the spring, have disappeared with the middle of the season, and live only in the memories of the people who carry on their books bills against the boats. The Sunday races between the Chicora and City of Toledo to St. Joe are abandoned. The Chicora carried off the honors, but marine men all say with more boiler power the City of Toledo would be the hardest boat to pass that ever came into Chicago. The fast time of the big whaleback is taken now as a settled thing, but the stories of twenty-three miles an hour and over, as well as those of 6,000 and 7,000 passengers in a load to Milwaukee are not being related these days. The Columbus can make 20 to 21 miles an hour for a steady run, and by crowding can, of course, do some better.

The absence of disasters in the blow of the early part of the week, is as good an index as any on the light condition of marine business. Had there been more boats out in a storm of that severity, it seems as though some of them would have brought up somewhere with great injury to themselves.

At the rate interest is growing in yachting here, it will be but a year or so before Chicago has the finest fleet of pleasure craft on the chain of lakes, and a good harbor to put them in, too. Then, and not until then, will we be in shape to fittingly receive visitors from anywhere on the lakes or coast. The open race last Saturday was the prettiest ever witnessed here. In addition to a score of racers, there was a big turnout of other sail and steam yachts.

An Opening in the St. Lawrence Grain Trade.

Special Correspondence to the MARINE REVIEW.

KINGSTON, Ont., Aug. 31.—The grain situation is further complicated by the announcement that the elevators at Ogdensburg are filled and for a week or more no further accommodation can be given there. The Montreal Herald in noting the blockade here suggests that the city of Kingston guarantee the bonds of a private concern which would put up an elevator to cost $300,000 or $400,000. That such a suggestion does not find favor here is manifest by by the replies of local newspapers. "The people have a fair amount of common sense," says the Whig, "and they are not going to bonus any further two companies that are so wealthy and independent that their stock is not purchasable at any figure. As a monopolistic combine they command exorbitant rates between Kingston and Montreal, as compared with rates from Chicago, and if they built half a dozen elevators in Kingston it would not be too great an expiation from the injury their want of proper enterprise to avoid delays has done to the port and to the whole St. Lawrence route. It is a wonder that some active Unlted States firm, seeing that money is being coined on the river, does not come over and take a hand in the freighting. The Montreal gentlemen who build steamers in Scotland out of thousands made in Kingston, may build elevators for their own trade."

The steamer Bannockburn was successfully towed in sections from Montreal and is now in the government dry dock, and will he united in a few days. She will be put into the Duluth-Kingston trade.

Official Numbers and Tonnage.

The bureau of navigation, E. C. O'Brien commissioner, assigned, during the week ending Aug. 20, official numbers to the following lake vessels and also passed upon their tonnage: Steam—W. P. Ketcham, Chicago, Ill., 946.38 tons gross, 759.59 net, No. 81,447; Fliseen, Oswego, N. Y., 25.32 tons gross, 12.66 net; No. 120,948. Sail—Jeannettie, Chicago, Ill., 11.76 tons gross, 11.17 net, No, 77,107.

HEAVY EAST-BOUND TRAVEL.—On account of growth of east-bound business, the Nickel Plate road will inaugurate a new through express on Sunday, Sept. 3. Palace sleepers Chicago to Buffalo and direct connection at Buffalo for all points east.

It is a pleasure to note the addition of another through train to the already competent train service of the Nickel Plate road. It will leave Chicago about 8 a. m. and reach Buffalo at 3 or 4 o'clock the following morning. Through sleepers Chicago to Buffalo. Direct connection at Buffalo for all points east.

PHOTOTYPES OF THE NEW NORTHERN STEAMERS, THE CHRISTOPHER COLUMBUS, THE S. S. CURRY AND TWELVE OTHERS, INCLUDING A PICTURE OF THE GREAT EASTERN, SENT TO ANY ADDRESS ON RECEIPT OF 50 CENTS BY THE MARINE REVIEW, NO. 516 PERRY-PAYNE BUILDING, CLEVELAND, O.

A Week in the Wilds of Lake Superior.*

[*Continued from Vol. 8, No. 8.*]

We were not long in closing negotiations for leaving Bayfield over the forest route to St.Paul. An Indian was found who had two ponies and who agreed to take us to Sunrise for $35, we to furnish everything but the horses, and insure against accident to them. We closed the bargain, and I undertook the commissary duties of the expedition by contracting for a bag of bread—those indigestible masses called "biscuits" in the western country—boiled fowls and a ham, four bags of oats, an axe, some tobacco and aqua vitæ. Our luggage and an old shot gun, with one barrel operative, made up the balance of the equipment. That evening we loaded up our wagon, inspected the horses, the Indian, and other details, and then went out on the route three or four miles to fish for trout and stay all night in a shingle camp. We caught a fine lot of these fish, which are plentiful in all streams flowing into the lake, but not in streams flowing the other way to the Mississippi. At 9 o'clock the next morning, our wagon, the Indian and outfit came along. We lit our pipes, climbed up to the after seat in the wagon and settled ourselves for a comfortable ride to sunrise on the St. Croix. The Indian, like all of his race, was taciturn, saw everything but made no sign, and to this day I know not if he understood what we said. When we climbed up on the wagon seat I heard him chuckle and saw him hide his face. We started and in five minutes the Indian shrank down into the front of the wagon below the seat, and the next minute Charlton and I were ignominiously brushed off by the low limbs of the pine trees. We took a survey of the case and saw at once that there was no such thing as riding on the wagon. Charlton climbed up again for another trial and I took the gun and went ahead on the trail.

The scene and surroundings were novel to me. The forest was wild, dark and still. By improvising bridges, cutting trees out of the trail and working hard, besides tramping, we made twenty miles, reached "Spider lake" and camped for the first night. A second day on our journey was much like the first, but the lakes changed in their nature as we left the coast. Anent this matter I must digress here to note a fact which seems to controvert the common theory respecting the genesis of the prairies.

Soon after we left the coast, and gained the general level of the country, there appeared pot holes or sinks of small size from 50 to 100 feet in diameter. These seemed to be excavations and looked strange, because in any country covered with clay soil such holes or basins, if they existed at all, would be filled with water. Here they were dry down to the very bottom, where there was usually a thick growth of American sarsaparilla. The whole country seemed to be covered with sand, only a light mold of vegetable matter on top under the timber, decomposed litter of the fir growth. These pot holes became gradually larger as we left the lake coast, and at thirty miles or so began to have some water at the bottom, with clean shores so one could approach the edge. The basins grew larger, so did the water at the bottom, until a fringe of grass appeared around the margin. This grass fringe grew wider as we went on toward the "divide," or where the watershed was westward. Soon we could not approach the water at all, because of the bog that surrounded it. As we went on, the grass and bog grew wider, and the water less until only a spot in the center, and finally disappeared altogether, the basins all the time becoming larger, flatter and shallower, until the little pot holes near the coast had developed into prairies of grass, small at first, but growing larger and more solid until the transition was complete; until the timbered or higher lands became the exception, and we were in a prairie country.

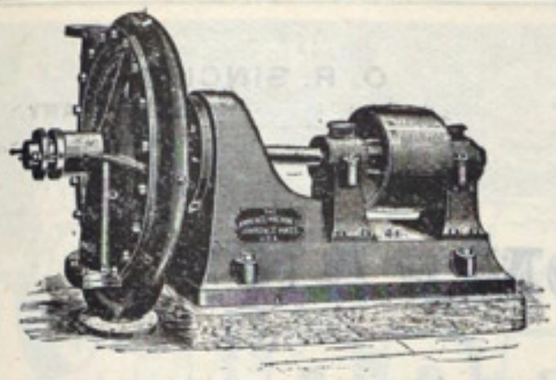
Getting back to our journey, the second night's camp was like the first, unless the quantity of mosquitos was more. It was about the last days of their career, and white blood was not a common repast about these lakes. We had ducks for supper this evening and on other evenings, and here were ducks that would please an epicure. In these highlands there is fresh water and pure feed, and there was none of that pungent fishy flavor of the salt water varieties. It was a most interesting thing to watch our Indian driver bring down ducks; they were flying overhead from one lake to another, at high speed and in straight lines, and how that son of the forest could see them, apparently without looking up, was a mystery. The old one-barreled gun he kept carefully in a kind of cloth cover, and while moving along we would observe him suddenly drop the lines, unstrip the old gun, and about the time he would bring it to position, the ducks would come in view. He rarely missed, and his seeing them coming was less mysterious than his finding them after they came down. I tried myself to find them in the high grass and rushes around the lakes, but as well might have searched for the proverbial needle in a haystack. The Indian would get down, move stealthily into the high grass, his black eyes glistening, and by some sign, perhaps by some mark beyond or some disturbance of the vegitation, he would walk straight to a duck and pick it up. On the third day out I shot a raven, and have never ceased to regret it; the plumage, jet black, was yet the most gorgeous imaginable, and in the sun gave the most beautiful changing hues like the gloss of satin, but finer. Eagles or large hawks were never out of sight, and the scream of terrified quail and grouse was heard at frequent intervals. The hawks would sit perched on the tops of the highest trees, usually burnt ones without foliage, and to see them dart down on their victims was terrific. It afforded a problem in dynamics. One would think that to stop within a few feet would kill them, and my belief is they do not stop, but brush over their prey, stunning or confusing it, and on a return swoop seize it.

On the fourth day out we reached a regular camp or residence of a civilized Chippewa who had built a house, or several houses, some of them of whip-sawed boards or planks, and here we learned a good deal of Indian customs in that country. Our host showed us religious service books, printed in his language, and had the interior of one of his houses quite covered with pictorial sheets from various serials. He was a mighty hunter, and that year had to his account thirty-five deer, several bears, and a collection of pelts from smaller animals. He had been wounded by a bite from a bear that crushed one of his knees, and was lame. Our man had some ducks which were to be prepared for supper. These were turned over to the women, and it was a marvel to see how soon the feathers were stripped and the game potted. We had here corn bread, potatoes and coffee, all prepared out in the forest away from the house,the host explaining that Indians never cooked in the house or staid in it during the summer. We were asked if we wanted fish for breakfast, "very fresh and just caught," the man explained. I made him promise to wake me in the morning to accompany him on the fishing excursion, which he did. He went to a stream near by, where there was constructed what is called a "fish pot" in this western country. It is an Indian contrivance, or trap, made of small poles, and is a sure catch for any fish descending the stream. There is a dam and an overflow or waste way, the water pouring over on a bed of small poles set at an inclination of twenty degrees or so, pointing back under the dam where there is a pool to contain the fish. When one goes over the dam, he lights on the screen of poles through which the water escapes, and wiggles back into the pool without hope of escape. The Indian took a kind of rake and drew up on the apron a "pile of fish," two dozen or more, and after selecting three or four black bass, he raised some poles in the bottom and let the remainder out; they went down the stream by scores on their journey, which had been so mysteriously interrupted. "Much more tomorrow," said the Indian' and we went back. While eating our breakfast we had an example of his skill with a rifle that I am almost afraid to relate. A large hawk came down among the fowls around the house, raising a great commotion. The Indian sprang up, seized a rifle from the wall, and ran out. We followed to see the fun. The hawk was sailing around in a circle at least 300 feet high, quite steady, and watching us. The Indian braced himself, pointed his gun and kept moving it with the hawk for some time and finally fired. The huge bird came down like a stone, but I must always think it was an accident, because the Indian was so elated over the feat. The next day brought us to the St. Croix river, a large, rapid stream even at that season, which we forded with difficulty and risk, and in the evening were again among white men and civilization, This, only twenty-five years ago, and now a railway and farms all along the same route. Bayfield a commercial port and small city, the Apostle islands a popular summer resort.

By John Richards, Editor of Industry, San Francisco.

NEW THROUGH TRAIN.—The Nickel Plate road announces that commencing Sunday, Sept. 3, train No. 4, running between Chicago and Cleveland, and No. 4, running between Cleveland and Buffalo, will be merged into a continuous through train, leaving Chicago about 8 a. m. and reaching Buffalo between 3 or 4 o'clock the following morning. The equipment of this train will embrace staanard smoking and day coaches and sleeping cars Chicago to Buffalo. Direct connections at Buffalo for all points east.

GROWING.—The Nickel Plate road will on Sunday, Sept. 3, increase its train service by the addition of a new through east-bound train, by merging the Chicago and Clevrland and Cleveland and Buffalo accommodation trains into a new through express with sleeping cars Chicago to Buffalo. Other important changes. Direct connection at Buffalo for all points east.



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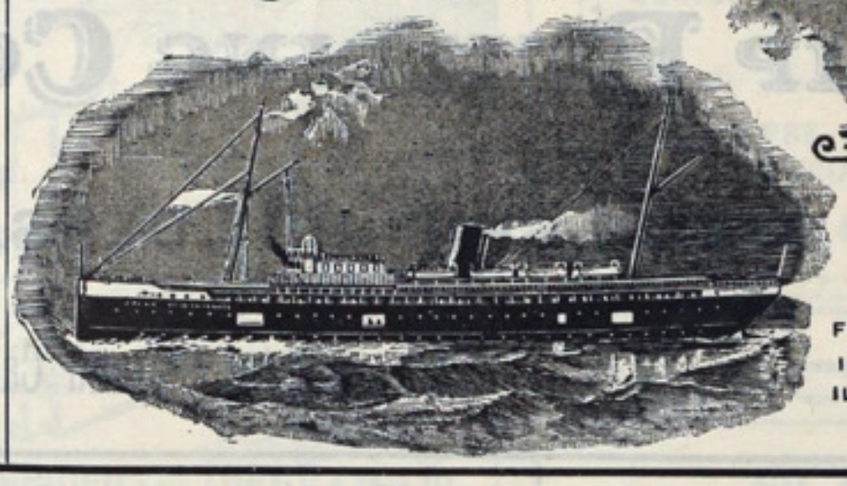

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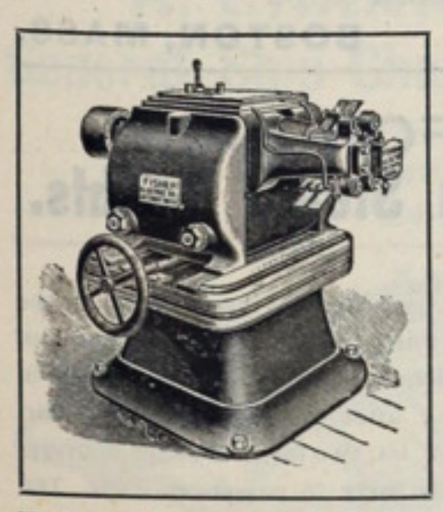

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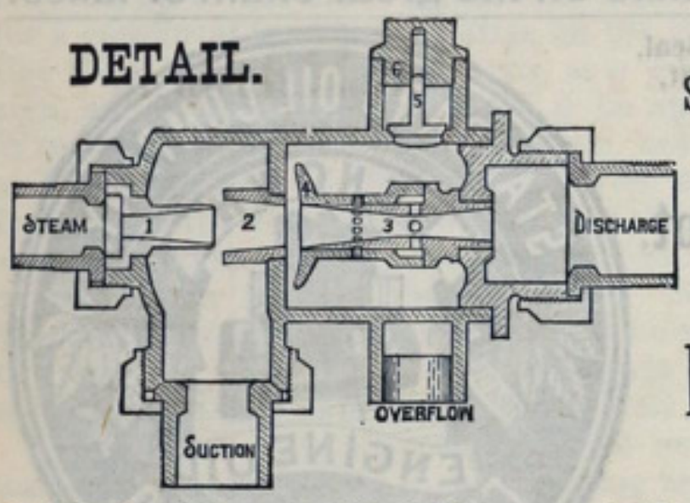

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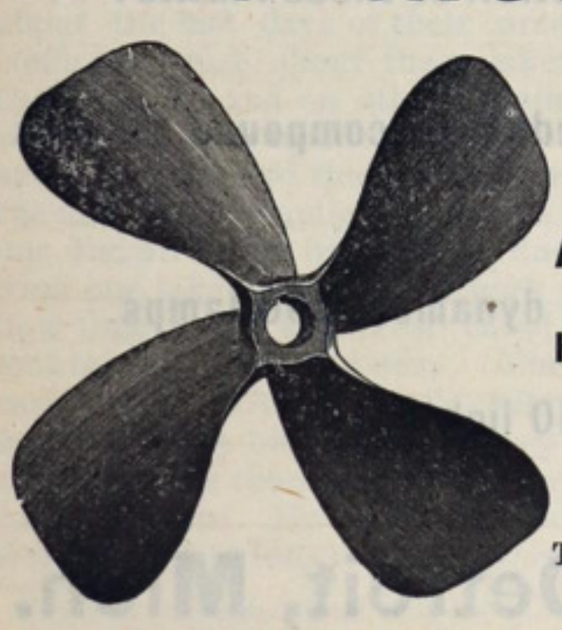

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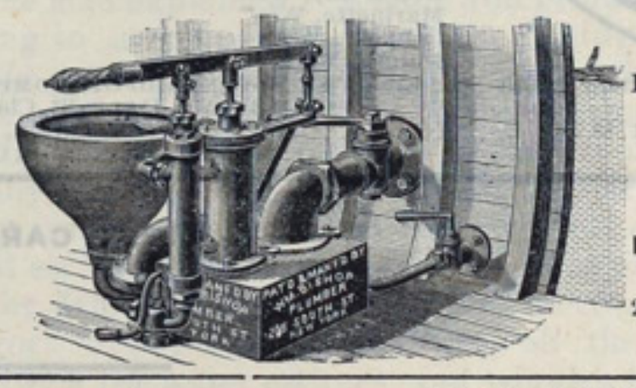

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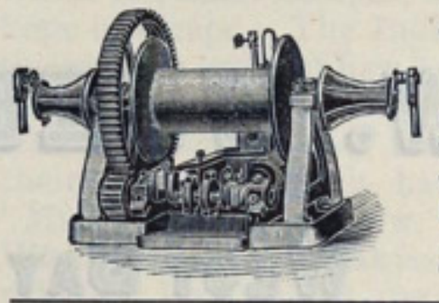

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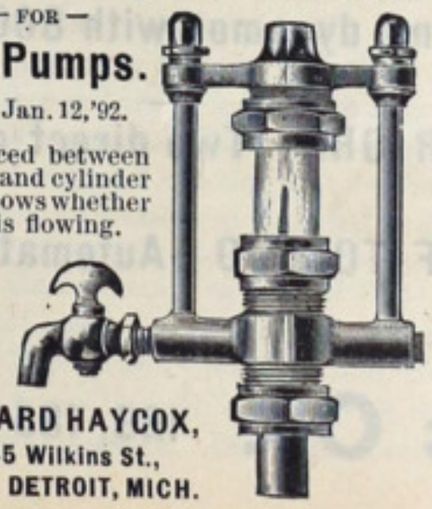

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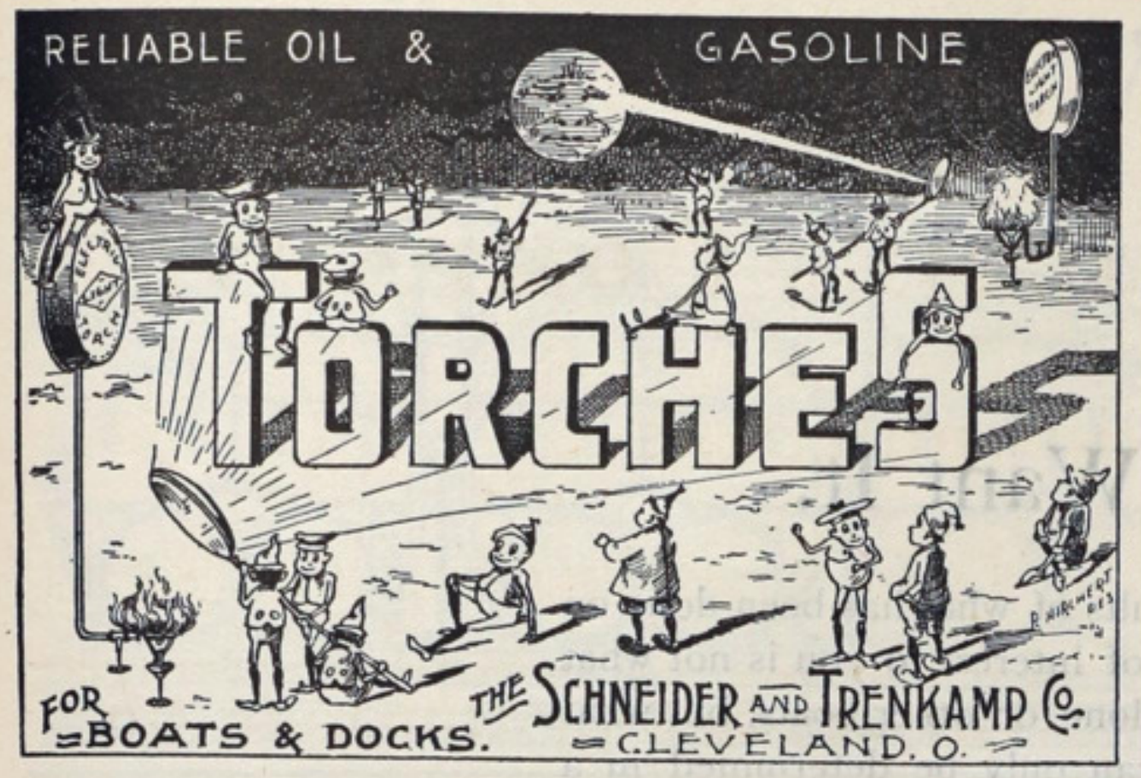

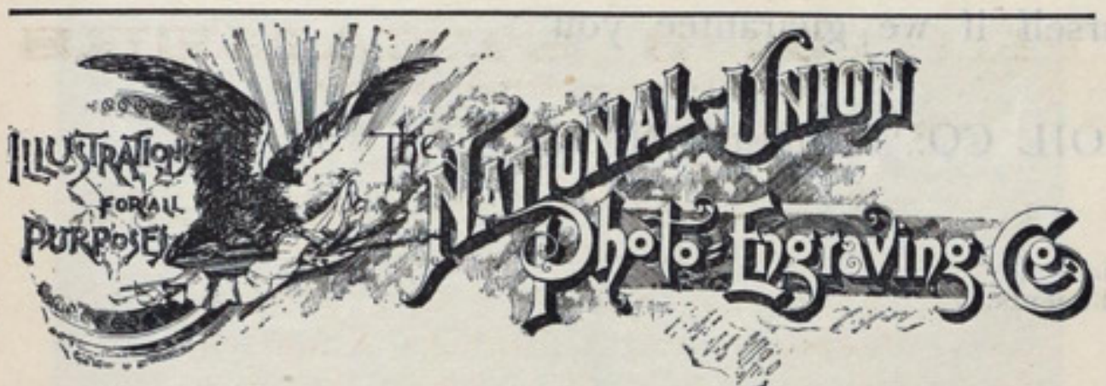

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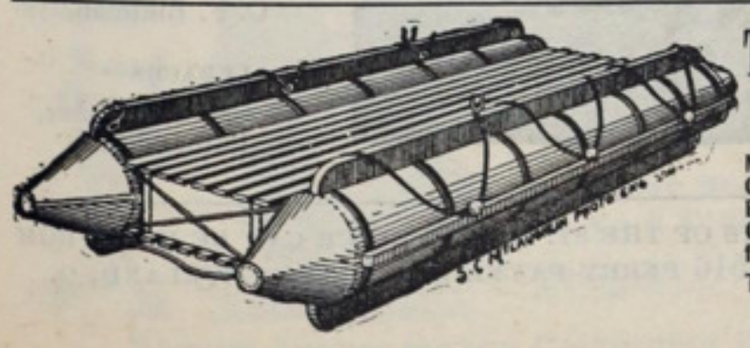

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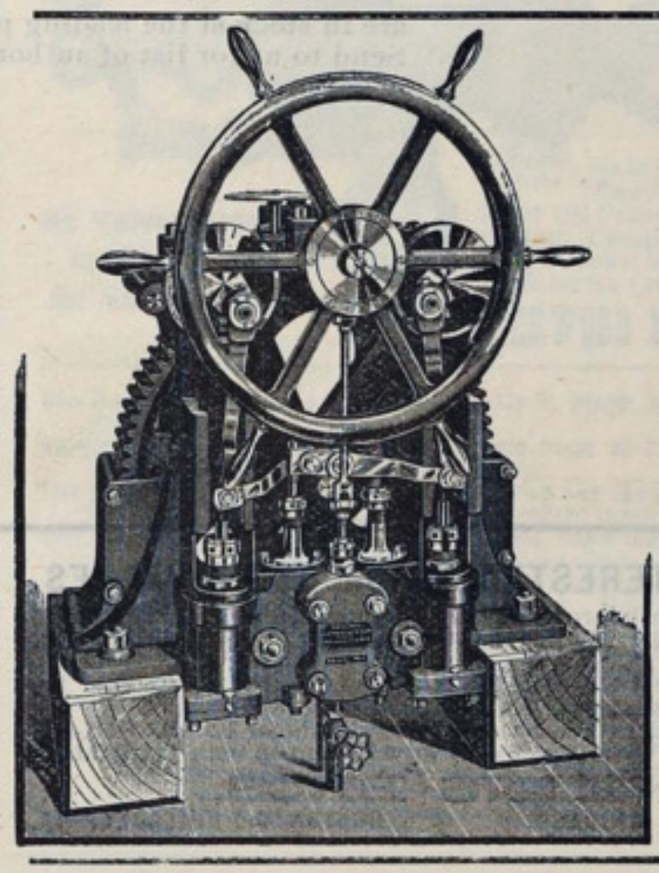

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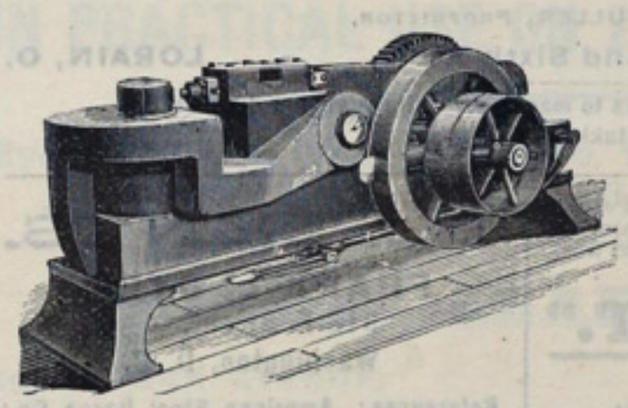

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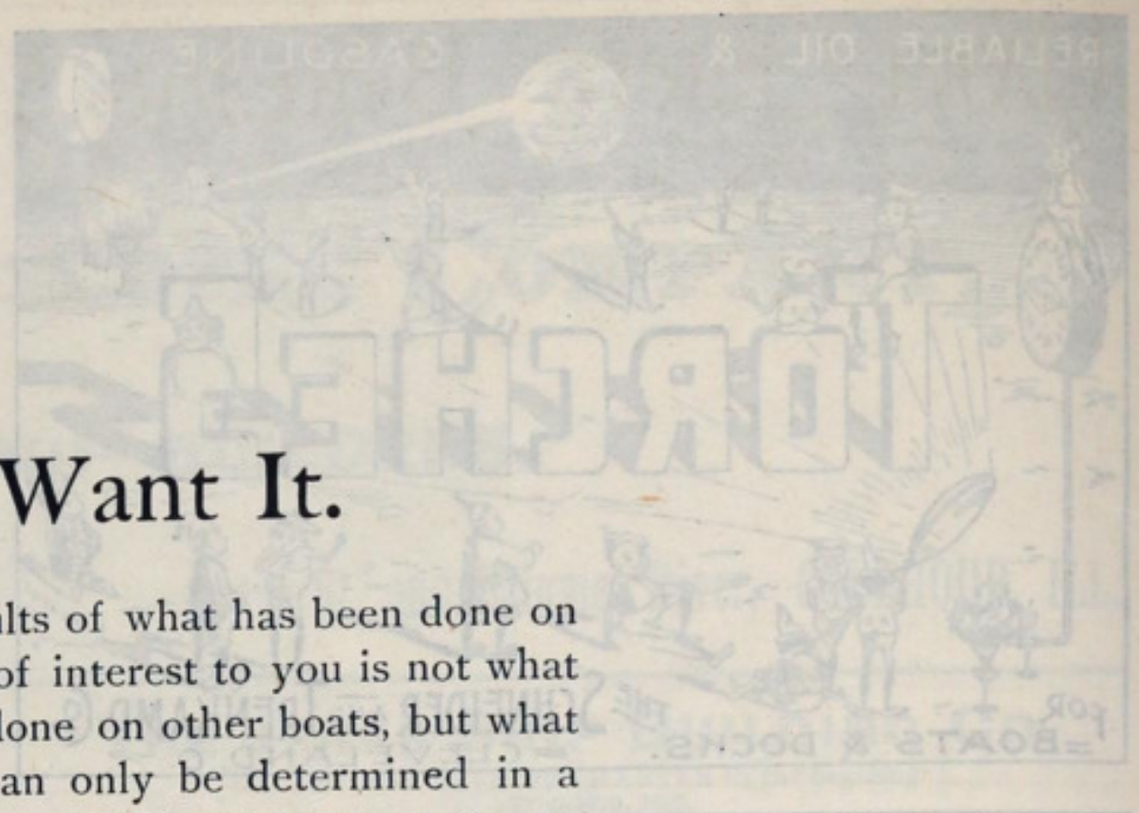

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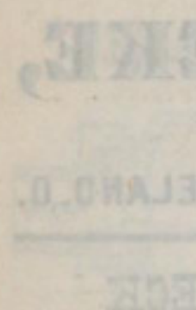

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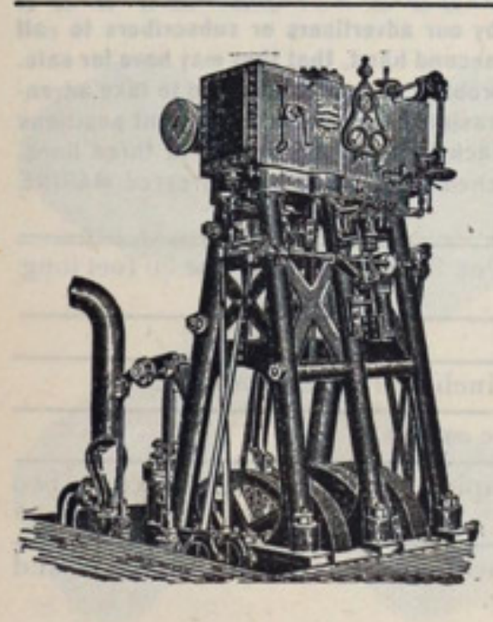

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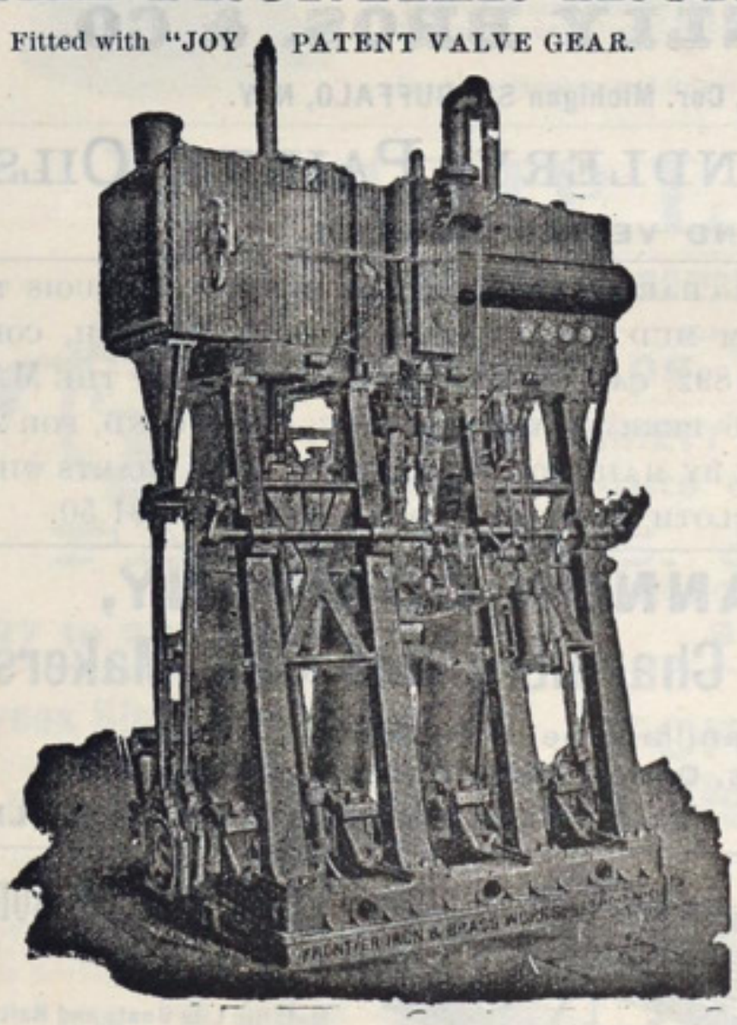

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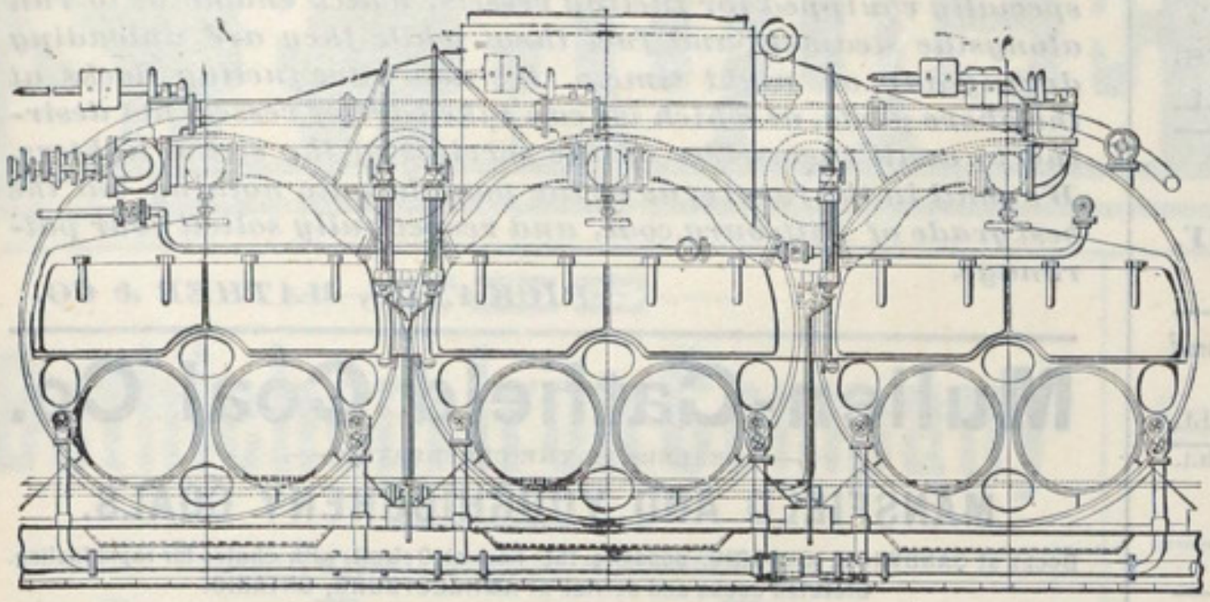

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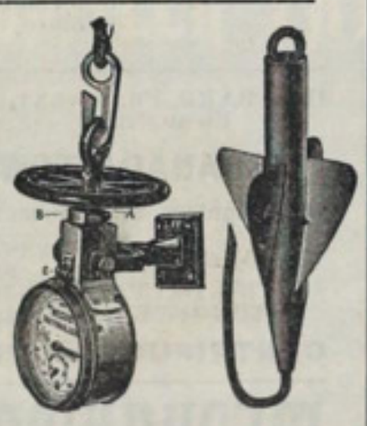

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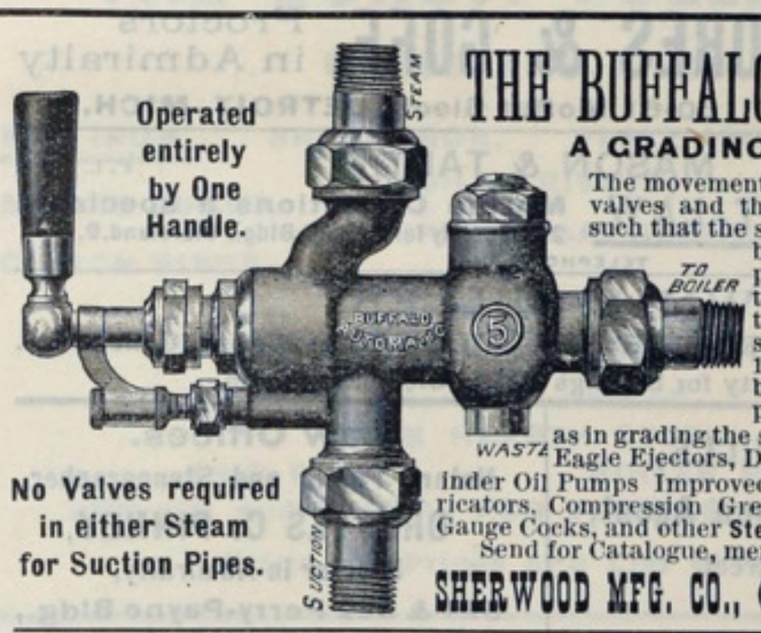

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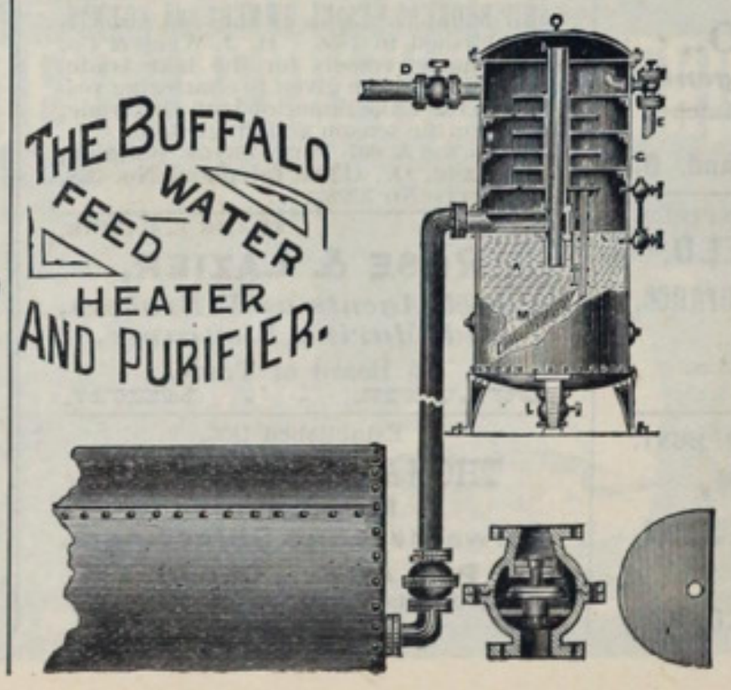

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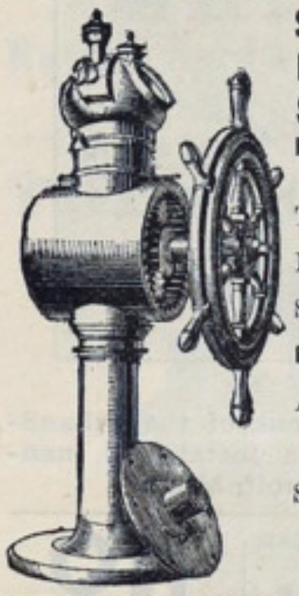

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8-24

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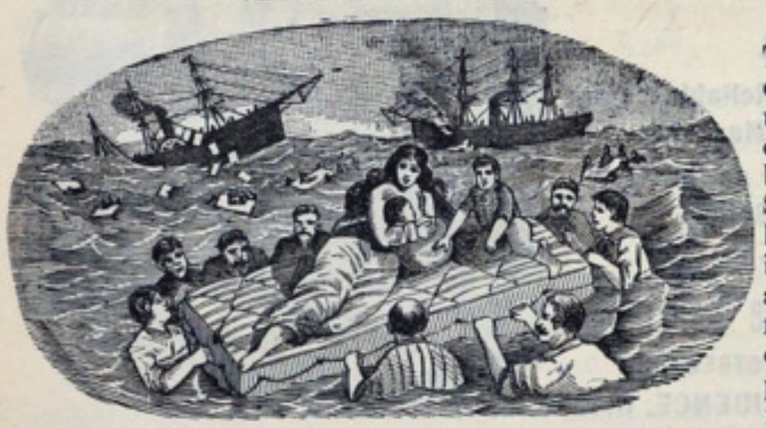

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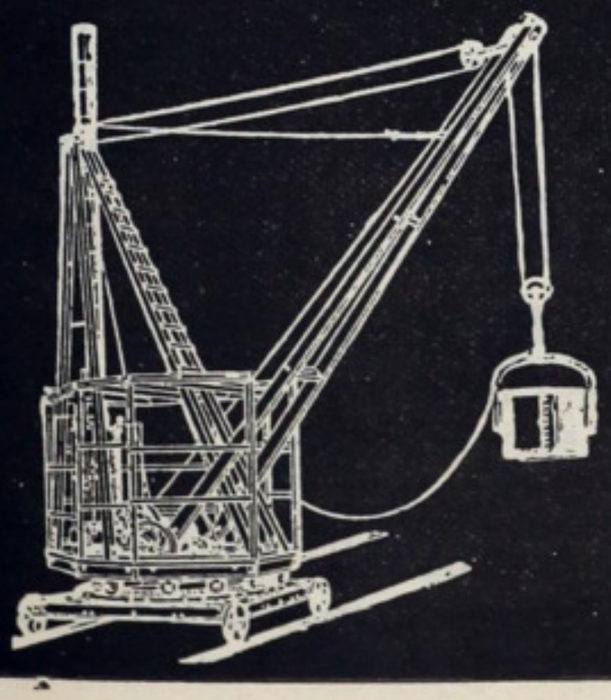

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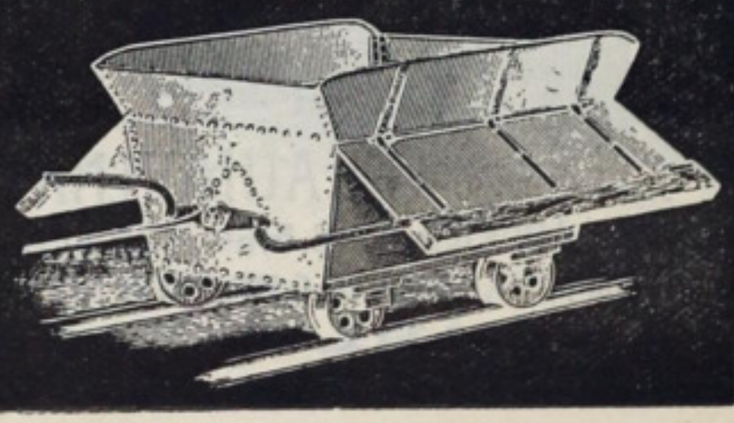

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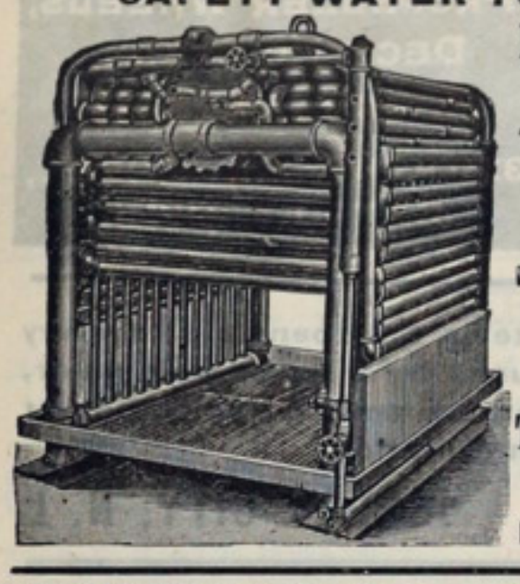

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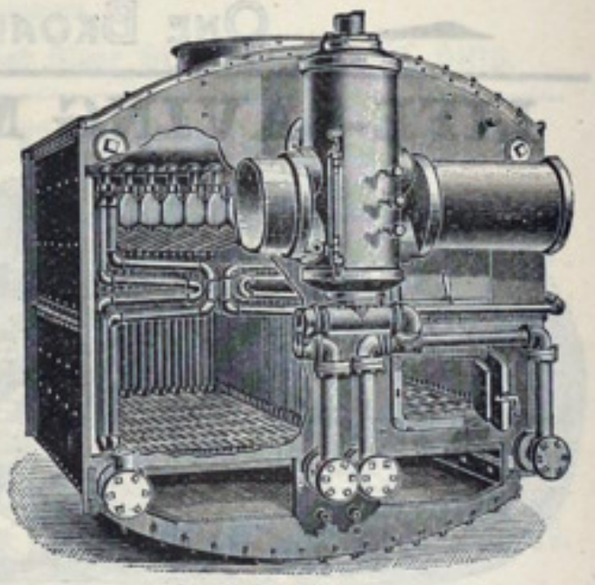

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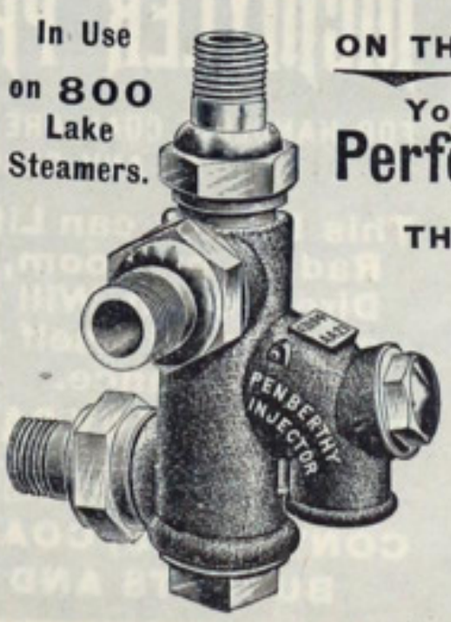

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